Printed Pages: 02 **Sub Code:NEE801**

Paper Id: **120250** **Roll No.** | | | | | | | | | | |

B. TECH.
(SEM VIII) THEORY EXAMINATION 2018-19
ELECTRICAL & ELECTRONICS ENGINEERING MATERIALS

Time: 3 Hours ***Total Marks: 100***

Note: 1. Attempt all Sections. If require any missing data; then choose suitably.

SECTION A

1. Attempt *all* questions in brief. **2 x 10 = 20**

a. Draw (112) & (111) planes in simple cubic cell.
b. Write ohms law for electron theory.
c. What do you mean by doping in semiconductor?
d. What is Curie temperature?
e. Explain Seebeck, Thomson Effect in thermocouple.
f. Mobility of electrons & holes in intrinsic semiconductor of germanium at room temperature are 3600 cm^2/v-s & 1700cm^2/v-s. if electrons & holes are equal to 3.2 X 10^{12} /cm^3 , find out conductivity.
g. What is Magnetostriction and its types?
h. Explain Body centered cubic structure (BCC)
i. Write composition of Alnico.
j. Explain Metallic bonding with diagram.

SECTION B

2. Attempt any *three* of the following: **10x3=30**

a. Explain the effect of temperature on electrical conductivity of metals. The following data refer to copper-
Density=8.94 gm/cm^3, resistivity=1.73×10^{-8} Ωm; atomic weight = 63.5
Calculate the mobility and average time of collision of electron in the copper.

b. Explain Bragg's, Law.,X ray of wavelength 1.54 A are used for calculating d_{200} in Ni . The reflection angle is 9.5 degree , what is size of unit cell.

c. Using drift and diffusion current in a semiconductor, find an expression of continuity equation.

d. Draw Diagrams giving energy band structure of an Conductor, insulator & semiconductor. Explain difference in their conductivity?

e. Describe soft and hard magnetic material indicates their composition, property also draw their B-H curve.

SECTION C

3. Attempt any *one* part of the following:

a. State Ionic, Covalent & Metallic bonds with their characteristics.

b. Explain Miller indices, write procedure to find it. Also prove that $d_{100}:d_{110}:d_{111}:\sqrt{6}:\sqrt{3}:\sqrt{2}$ for a simple cubic system.

4. Attempt any *one* part of the following:

a. Write short note- Soft Magnetic material, Hard Magnetic material also draw their B-H curve.

b. Explain Ferromagnetism, Ferri magnetism, Anti ferromagnetism material with their properties.

5. Attempt any *one* part of the following:

a. With the help of neat sketches and characteristic curves explain the operation of the Junction FET.

b. Calculate the drift velocity of electrons & holes in (i) Si (ii) Ge at 300K when applied electric field is 50v/cm take μ_p = 500 cm^2/v-s , μ_n= 1500 cm^2/v-s for Si , μ_p = 3700 cm^2/v-s , μ_n= 3600 cm^2/v-s for Ge.

6. Attempt any *one* part of the following:

a. Write short notes on followings:
(i) Fermi surface
(ii) Energy gap
(iii) Energy level

b. Find energy loss per hour in Iron subjected to magnetization 50 c/s . the iron weight 50 kg & hysteresis loop area 250 joules / m^3. Density of iron= 7000 kg/m^3

7. Attempt any *one* part of the following:

a. What is Hall Effect; derive the relation between hall coefficient and current density. Assume presence of only one charge carrier.

b. Explain the term superconductivity. Name some of the important superconductivity elements compound and alloys.